Confined Space Entry

1 PURPOSE

To minimize the risks associated with working in confined spaces by establishing entry procedures for all personnel on board MSC ships.

Every confined space shall be treated as though it poses a deadly threat. Any space that has limited access and is poorly ventilated is capable of causing injury, illness or death to a worker. Accidents have occurred from failure to recognize that a confined space is a potential hazard.

When confined space entry is required , the requirements of SMS Procedure 2.1-020-ALL, Gas Free Engineer and SMS Procedure 2.1-021-ALL, Ship's Use of a Certified Marine Chemist & Contractor / Shipyard Requirement for Establishing Gas Free Conditions shall also be observed.

2 APPLICABILITY: Current release date: **January 2021**

2.1 Safe confined space entry practices depend on a systematic approach of ***recognition***, ***evaluation*** and ***control***. The Gas Free Engineer, assigned by the Ship's Master is responsible for ensuring that the entry plan recognizes the dangers inherent in a confined space, properly evaluates each situation, and takes measures to control and minimize all hazards.

3 BACKGROUND & PROCEDURES

3.1 **Initial Entry Requirements for Verifying Gas Free Condition:** The following procedures shall be observed when certifying the space gas free

by the ship's GFE. If a contract Marine Chemist is hired, ship's force may be required to provide a standby person and rescue personnel. The Ship's Master, Ship's GFE, and Contract Marine Chemist shall clearly delineate duties to ensure a safe operation.

3.1.1. The Ship's Gas Free Engineer (GFE) shall certify that a confined space is gas free and safe for the work being conducted following the procedures established in SMS Procedure 2.1-020-ALL, Gas Free Engineer, and a Gas Free Certificate will be prepared using SMS Checklist 2.1-020-01-ALL and posted at the space.

3.1.2. A contract Marine Chemist and personnel gas freeing for contractors and shipyards may use proprietary forms and checklists to enter and certify a space gas free and safe for the work being conducted. Procedures are outlined in SMS Procedure 2.1-021-ALL, Ship's Use of a Certified Marine Chemist & Contractor / Shipyard Requirement for Establishing Gas Free Conditions.

3.1.3. Pre Entry Preparations:

- Forced mechanical ventilation: There shall be a **minimum of two air changes prior to entry into a confined space**. Effectiveness of ventilation shall be verified using atmospheric tests. It is recommended that the space be opened the day before and allowed to ventilate for at least 12 hours. The space shall remain continuously ventilated until work is complete and space resealed.

- Confined space entry permit, SMS Checklist 2.1-001-01 shall be completed as applicable.

- Consult rescue plan and brief plan to stand-by person and rescue team. Size and configuration of rescue team shall take into account difficulty and complexity of anticipated rescue.

- Ensure Blocks (as needed) to rig rescue lines are on station.

- Ensure Tending lines and harnesses of sufficient length and strength to enable removal of an injured person are on station at entry point.

- Provide sufficient and proper (intrinsically safe) lighting.

- If radio communications are going to be used ensure that all radios are intrinsically safe.

- Ensure a Litter, AED and CPR qualified individual are onboard.

- An appropriate number of back up SCBA bottles shall be staged, commensurate with the complexity of rescue.

3.1.4 Entry Requirements

- The GFE shall be wearing proper PPE, a SCBA, safety harness, tending line, and communications equipment.

- The rescue team shall be wearing proper PPE, SCBAs, tending lines, and communications equipment.

- A standby person shall be stationed outside the space maintaining communications with the personnel inside and capable of supervising rescue operations.

- Notify Watch Officer at time of entry.

- The GFE will test the space per SMS Procedure 2.1-020-ALL.

- General ventilation may be utilized in a confined space to provide uncontaminated air for breathing and to maintain general comfort of personnel. It may also be used to maintain concentrations of toxic and flammable atmospheres at acceptable levels where the sources of such contaminants are small and evolution of airborne contaminants is low. The accepted practice and the required level, as identified in reference 5.2 for general ventilation, is one complete air change every three minutes. Therefore, a 30,000 cubic-foot space requires a general ventilation rate of 10,000 cubic feet per minute (ft3 /min).

3.2 **Entry Requirements for Work Parties:** The following procedures shall be observed when personnel are working in the space.

A list of all persons in the space shall be maintained by the standby person.

SHORE-BASED PERSONNEL TRAINING REQUIREMENTS

ALL shore based personnel entering confined spaces are required to have annually completed the "MSC-Confined Space Entry" training located on the Total Workforce Management Services (TWMS) website (course number TWMS 626545).

No persons shall enter a confined space unless a current, Gas Free Certificate is posted outside the space.

3.2.1 Pre Entry Preparations:

- SCBAs, harnesses, tending lines, and communication equipment shall be staged at the space and in sufficient numbers to equip a rescue team to enter the space.
- A standby person is posted outside the space. Duties of the standby person are outlined in section 3.4 of this procedure.
- All personnel shall be wearing proper PPE.
- Personnel briefed and trained on a confined space rescue and part of the rescue team shall be on board the ship and ready to respond if the alarm is sounded.

3.2.2 Entry Requirements:

- The space shall be immediately evacuated if ventilation stops or if any conditions noted in the confined space entry permit change.

Conditions may change due to paint vapors, oxygen enrichment or depletion from torch cutting (OSHA 29 CFR 1915, Subpart P), or solvent cleaning. The atmosphere could change due to the sun heating a tank or agitation of material in the space.

While crewmembers are in a confined space, the Standby Person shall continually monitor the space.

3.3 The Standby Person shall:

- Remain outside the space, at all times, when personnel are in the space.
- Ensure that the confined space is not tampered with while personnel are in the space.
- Be cognizant of changing conditions in the space and inform the Gas Free Engineer of the changes.
- Maintain an accurate count of persons working within the confined space by maintaining regular contact with all entrants.
- Maintain the conditions and requirements as listed on the Confined Space Entry Permit.
- Notify everyone to evacuate the space if a hazardous condition is observed.
- Sound the alarm for the Rescue Team to muster and prepare for casualty evacuation if communication with those in the confined space is lost or an accident is suspected.

The Standby Person shall NOT leave the area while people are in the confined space, except to get help in an emergency.

The Standby Person shall NOT enter a space to assist or rescue a worker unless relieved by another Standby Person.

3.4 The Master should be satisfied that whenever outside contractors are employed that safe practices are followed by contract personnel.

3.5 Confined Space Markings: All permit required spaces shall be signed in accordance with 29 CFR 1910.146(c)(2). The sign shall state "DANGER - PERMIT REQUIRED CONFINED SPACE, DO NOT ENTER," or similar verbiage.

4 RECORDS & REPORTS

4.1 Confined Space Entry Permit, Checklist 2.1-001-01.

4.2 Gas Free Certificate, SMS Checklist 2.1-020-01.

4.3 SMS Procedure 2.1-021-ALL, Ship's Use of a Certified Marine Chemist & Contractor / Shipyard Requirement for Establishing Gas Free Conditions.

4.4 SMS Procedure 2.1-020-ALL, Ship's Gas Free Engineer

5 REFERENCES

5.1 Navy's Gas Free Engineering Course K-495-0051.

5.2 Naval Ship's Technical Manual Chapter 074, Volume 3 – Gas Free Engineering

5.3 International Safety Guide for Oil Terminals and Tankers (ISGOTT), 4th Edition.

5.4 OSHA (PEL), Subpart Z, 29 CFR 1915.1000

5.5 The American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values for Chemical Substances and Physical Agents.

5.6 MSC-Confined Space Entry training located on the Total Workforce Management Services (TWMS) website (course number TWMS 626545) at: https://twms.navy.mil/selfservice/login.asp.

5.7 29 CFR 1910.146

6 DEFINITIONS

6.1 **Certified Industrial Hygienist (CIH)** – An industrial hygienist who is certified by the American Board of Industrial Hygiene.

6.2 **Certified Marine Chemist** – An individual who possesses a current Marine Chemist Certificate issued by the National Fire Protection Association (NFPA).

6.3 **Competent Person** - An individual, designated by employer, with specific skills, knowledge, and abilities based on the criteria set forth in 29 CFR 1915.7.

6.4 **Confined Space** – A confined space is any space which (see 29 CFR 1910.146):

- Is large enough and so configured that an employee can bodily enter and perform assigned work,
- Has limited or restricted means for entry or exit, and
- Is not designed for continuous employee occupancy for a worker to enter and do work.

Confined spaces may include, but are not limited to: double bottoms, voids, tanks, vats, degreasers, reaction vessels, boiler water and firesides, ventilation and exhaust ducts, pipelines and condensers.

6.5 **Entry** - The action by which a person passes through an opening into a space. Entry includes ensuing work activities in that space and is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space.

6.6 **Enter with Restrictions** - Denotes a space where entry for work is permitted only if engineering controls, personal protective equipment, clothing, and time limitations are as specified by the Marine Chemist, Certified Industrial Hygienist, shipyard Gas Free Engineer or the Ship's Gas Free Engineer.

6.7 **Gas Free (Marine Chemist's) Certificate** - A gas free certificate is a document issued by a Gas Free Engineer, Competent Person, or Certified Marine Chemist stating that tests were conducted and the status of a space at the time of the test. The certificate will indicate the type of work that is permitted in the space (Safe for Workers, Safe for Hot Work, etc.) and the required precautions to follow.

6.8 **Gas Free Engineer** - The Master-assigned ship's Gas Free Engineer or other senior ship's officer that has been trained and qualified to conduct testing of confined spaces. When at sea, the Gas Free Engineer shall

conduct tests of confined spaces to ensure the safety of crewmembers entering the confined space. The Gas Free Engineer shall have completed the Navy's Gas Free Engineering Course K-495-0051.

6.9 **Hot Work** - Welding, oxy-acetylene cutting, heating, and other fire producing or spark producing operations, such as grinding, that may increase the risk of fire or explosion.

6.10 **Rescue Team -** Rescue teams shall meet the requirements of 29 CFR 1915.12 (e).

6.11 **Safe for Hot Work** – Denotes a space that meets the following criteria: (1) The oxygen content of the atmosphere is between 19.5-23.5%. (2) The concentration of flammable vapors in the atmosphere is less than 10% of the lower explosive limit (LEL). (3) The residues or materials in the space are not capable of producing a higher concentration than permitted in item (1) or (2) of the above, under existing atmospheric conditions in the presence of hot work and while maintained as directed by the Marine Chemist or Gas Free Engineer. (4) All adjacent spaces have been cleaned, or inerted, or treated sufficiently to prevent the spread of fire.

6.12 **Safe for Workers** - Denotes a space that meets the following criteria: (1) The oxygen content of the atmosphere is between 19.5-23.5%. (2) The concentration of flammable vapors in the atmosphere is less than 10% of the lower explosive limit (LEL). (3) Any toxic materials in the atmosphere associated with cargo, fuel, tank coatings, or inerting media are within permissible concentrations at the time of the inspection. (4) Any residues or materials associated with the work authorized by the Marine Chemist, Certified Industrial Hygienist, or Gas Free Engineer that will not produce uncontrolled release of toxic materials under existing atmospheric conditions while maintained as directed.

6.13 **Standby Person** - A person assigned by the Gas Free Engineer to remain outside of, and in close proximity to, the confined space and capable of being in continuous communication with and to observe those inside, if practicable. The Standby Person shall initiate rescue procedures and operate and monitor equipment used to ensure safety during entry and work in the confined space.

6.14 **Visual Inspection** - The physical survey of the space, its surroundings and contents to identify hazards such as, but not limited to, restricted accessibility, residues, unguarded machinery, and piping or electrical systems.

7 REVISIONS

Original	17 Mar 2004
Rev 1.0	22 Sep 2004
Rev 2.0	06 Dec 2006 – Replaced gas free checklist with OPNAV 5100/16 form. Changed oxygen level reference from 20.8% to between 19.5 and 22%. Procedure incorporates ORM. Global replacement of Competent Person with Gas Free Engineer.
Rev 3.0	05 Dec 2007 – Complete revision. Gas Free Engineer developed into SMS Procedure 2.1-020-ALL and 2.1-021-ALL. Section 2, Applicability-Changed to reflect current release date.
Rev 3.1	19 Feb 2008 – Revised definition for Confined Space.
Rev 3.2	26 Jan 2009 – Added Section 3.6 requiring signage on confined spaces; added warning requiring shore-based personnel required to have training as well.
Rev 3.3	01 Mar 2010 – Changed training requirements in para 3.3 for shore based personnel from NKO to hyperlinked MSCHQ N732 training slides. Added reference 5.6. Added general ventilation info in para 3.2.4.
Rev 4.0	18 Nov 2016 – Moved par. 3.1 to “Applicability” section and re-numbered par. 3. Modified language related to par. 3.1.3 regarding having a CPR qualified person onboard. Removed language in par. 3.2. related to EEBDs. EEBDs are designated for emergency escape only (language appeared to promote EEBD use for entry). Additional non-substantive changes made.